

Lesson 5

Temperature Conversions (Celsius and Fahrenheit)

Temperature

In the SI, temperatures are measured using the Celsius scale. Because the Celsius system is a 100-step scale from the freezing to the boiling point of water, it is sometimes referred to as centigrade, from the Latin words meaning 100 steps.

On the Celsius scale 0° is the freezing point of water, while on the Fahrenheit scale, water freezes at 32° . Other equivalencies that exist are shown in the chart below:

EQUIVALENCIES IN FAHRENHEIT AND CELSIUS UNITS		
<i>Example</i>	$^{\circ}F$	$^{\circ}C$
Bitterly cold day	-22	-30
Mild day	59	15
Hot day	81	27
Normal body temperature	98.6	37
Boiling water	212	100

Temperature Conversions

How to convert between degrees Celsius (°C) and degrees Fahrenheit (°F):

Use the conversion formula:

How can we use this formula to find °C?

$$F = \frac{9}{5}C + 32$$

$$C = \frac{5}{9}(F - 32)$$

Note: Answers should be given to the nearest half degree.

Convert the following:

1. 27°C into °F 2. -4°C into °F

$$F = \frac{9}{5}(27) + 32 \\ = 80.6 = 80.5^\circ\text{F}$$

3. 100°F into °C 4. 84°F into °C

$$C = \frac{5}{9}(F - 32) \\ = \frac{5}{9}(100 - 32) \\ = 37.7 \\ = 37.5^\circ\text{C}$$

$$10.2 \rightarrow 10 \\ 8.4 \rightarrow 8.5$$

Example 1:

Todd is transporting frozen food from Boston to Moncton in a refrigerated truck. The safest temperature for preserving food is between 0°F and -4°F. At the Canadian border the guard determined the truck temperature to be -19°C.

Is the food being preserved properly?

Use the conversion formula to determine the temperature(s) at which degrees Celsius equal degrees Fahrenheit.

$$F = \frac{9}{5}C + 32$$

Classwork/Homework

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1. Cooked meat must reach a recommended internal temperature before it is safe to eat. A cookbook contains a list stated in degrees Fahrenheit.

Determine the corresponding temperatures in degrees Celsius.

FIGURE 5.1

Recommended Internal Temperatures

<i>Meat</i>	<i>Temperature</i>
ground meats	160°F
beef (medium rare)	145°F
beef (well-done)	170°F
chicken (whole)	165°F

2. Mandy supervises a road construction crew. She knows that she must modify the asphalt paving mixture her crew uses if temperatures drop below 21°C. What is this temperature in degrees Fahrenheit? Why would temperature have an effect on the paving mixture?

3. Chan works at a building construction site. His boss told him that he does not have to work if the temperature is above 105°F or below -15°F . Chan has a thermometer that measures in degrees Celsius. What are the temperatures given by Chan's boss, in degrees Celsius?
4. Pedro purchased a new crimper for his hair salon. The regulations state that the surface temperature, when in use, will be $(230 \pm 10)^{\circ}\text{C}$. What is this in degrees Fahrenheit? Express the answer in the form $(T \pm t)^{\circ}\text{C}$.